



Sun/3 Mass Storage Subsystem 71, 141 and 327 MByte Drives Installation Manual

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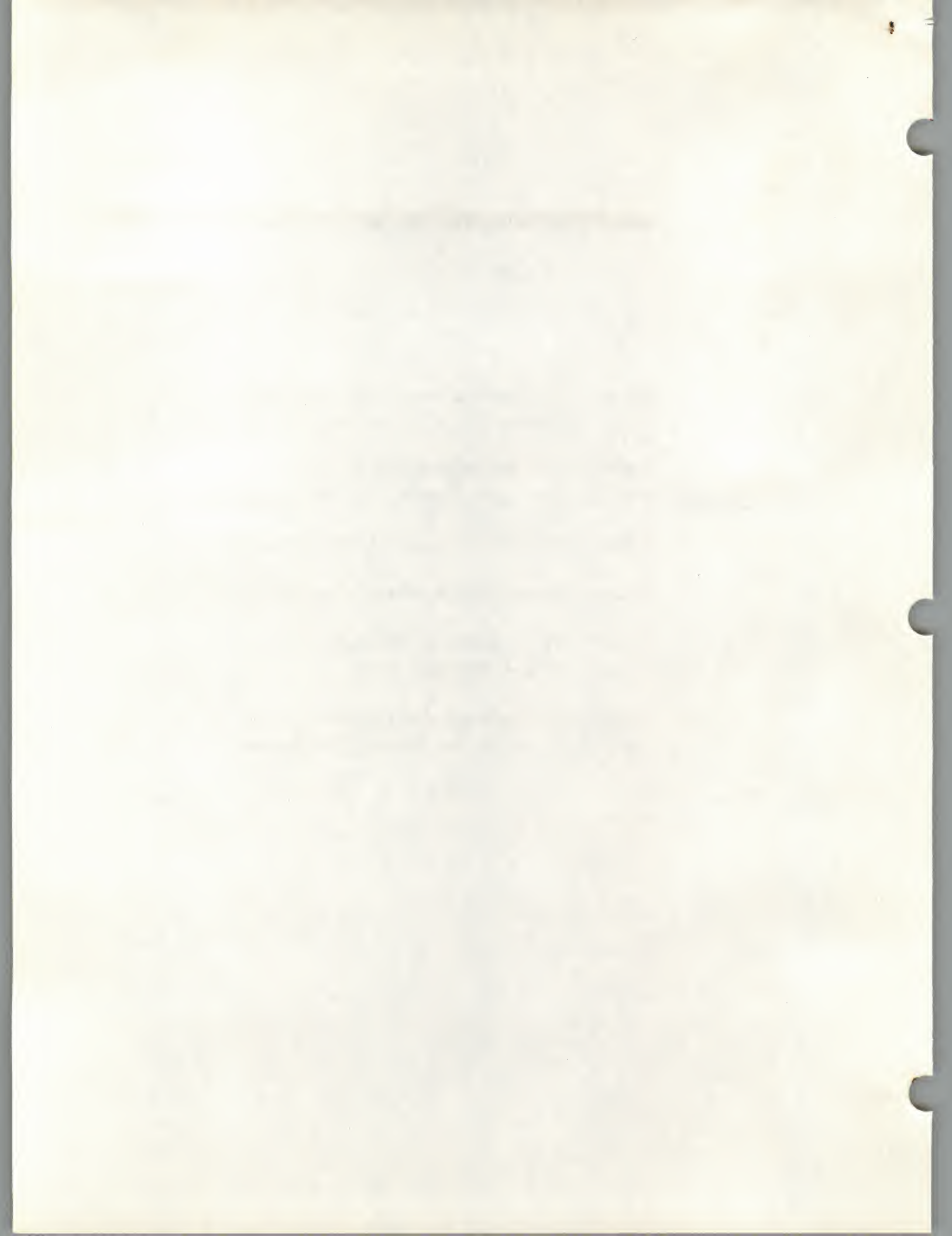
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Preface

The Sun/3 Mass Storage Subsystem is available in a number of configurations (see Section 1.1 of this manual for a general overview of the options available), and some of these configurations include a tape drive, but throughout this manual the Sun/3 Mass Storage Subsystem is described as either the Desk-Top Disk Subsystem (Target 0) or the Desk-Top Expansion Disk (Target 1). When referring to the Storage Subsystem options in a general way, they are called simply "the Subsystem."

NOTE Only the initial (Target 0) Desk-Top Disk Subsystem is available with a tape drive.

No matter what option you have chosen for your needs, it can be placed next to the workstation either horizontally or vertically. If the Subsystem is placed in the vertical position, it should only be placed on its right-hand side in the pedestal provided for this purpose.

This document provides the information necessary to connect the Sun/3 Mass Storage Subsystem to all applicable Sun Workstations.

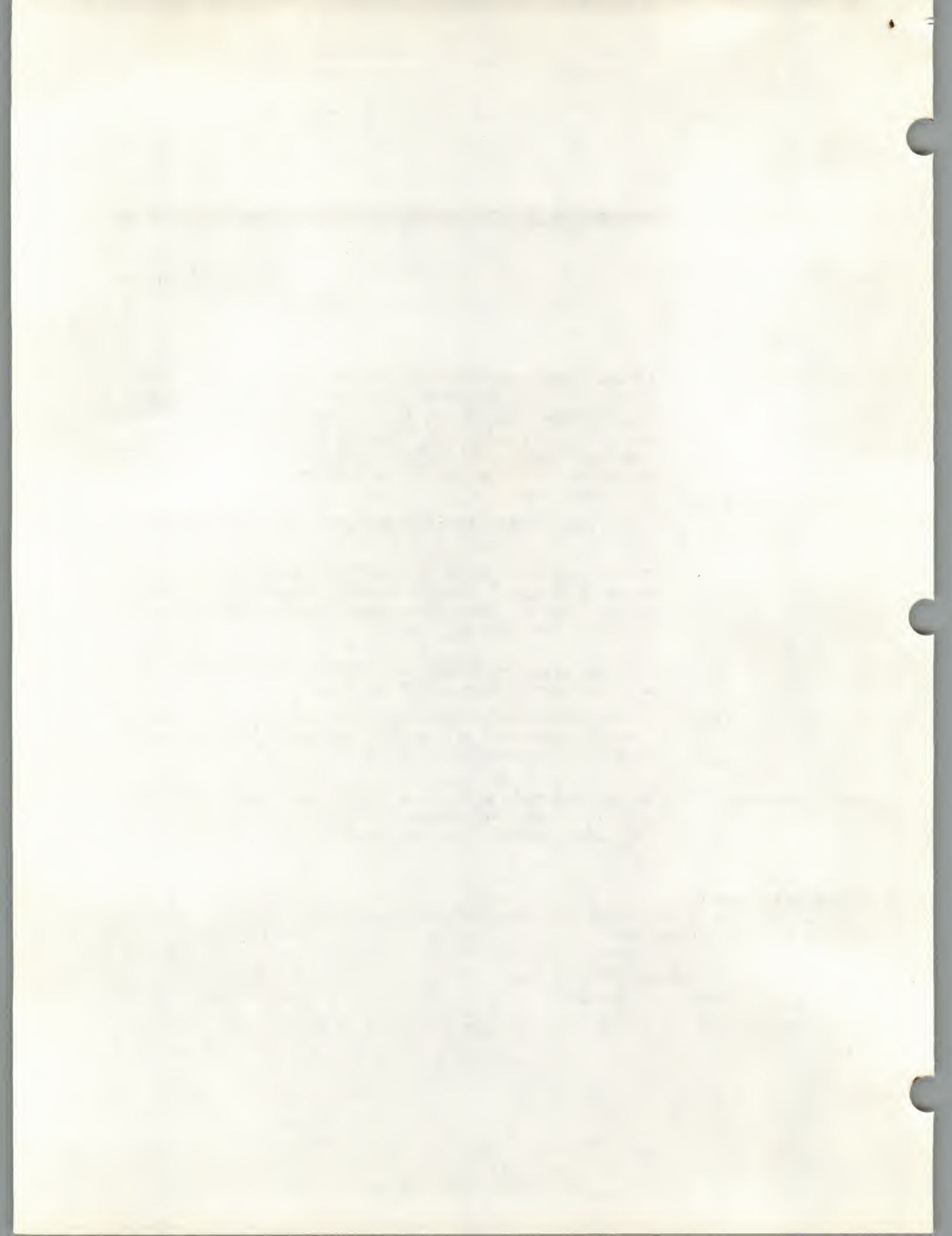
NOTE Note that whether or not all the following procedures apply to a particular subsystem is dependent on which configuration was installed and the type of Workstation it is to be connected to.

Assumptions About Reader Knowledge

This manual assumes that the reader is acquainted with the general principles governing the operation of winchester-type disk and streaming tape storage devices, and has a working knowledge of the Small Computer Standard Interface (SCSI).

Other Applicable Documents

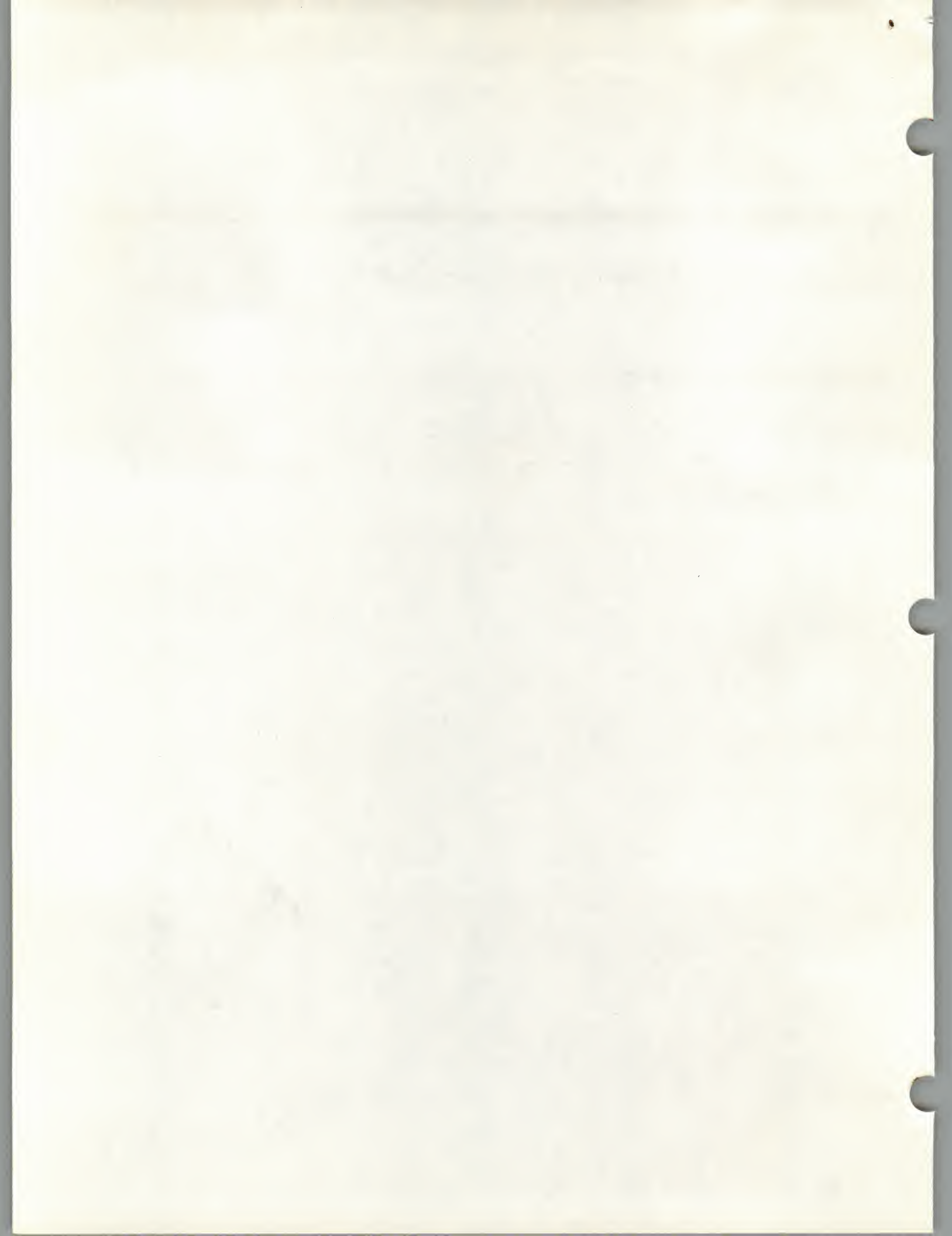
Document Name	Sun Part Number
<i>Installing UNIX on the Sun Workstation</i>	800-1317-XX
<i>Cardcage Slot Assignments and Backplane Configuration Procedures</i>	813-2004-XX



Introduction and Theory of Operations

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Introduction and Theory of Operations

1.1. Introduction

The Sun/3 Mass Storage Subsystem is designed to operate with Sun's desktop workstations to produce a low cost, "standalone" workstation.

The Mass Storage Subsystem is available in a variety of configurations (or Options). These Options can be divided into four major categories:

- Workstation Application (Sun-3/50, -3/110, etc.)
- Disk Drive Memory Storage Capacity (71, 141 or 327 MBytes)
- Drive Controller Target Number (is it the first or second disk drive connected to the Workstation's SCSI bus)
- Tape Drive Availability (the tape drive is available only in conjunction with the first disk drive).

NOTE

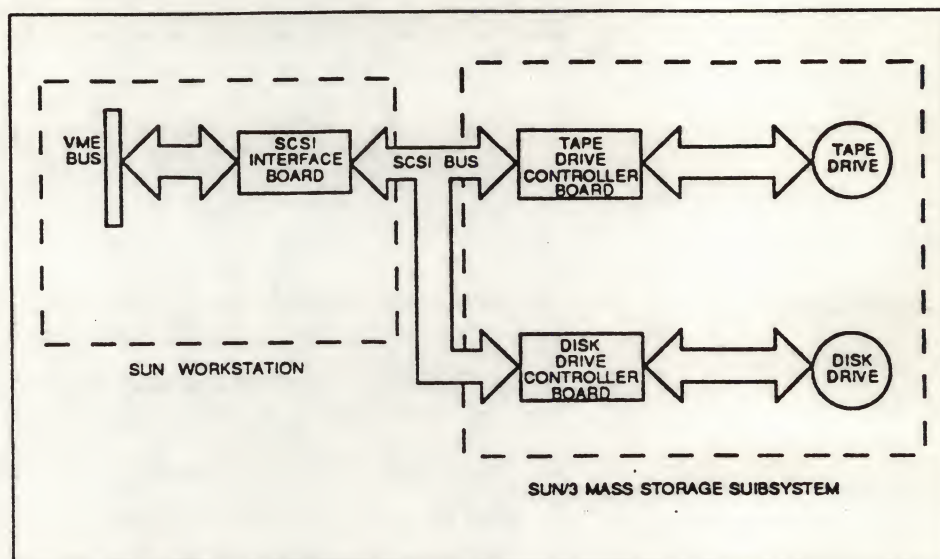
Only two disk drives can be connected per system.

These major categories almost completely overlap each other. This means that any two of the three disk drive storage capacities are available (with or without one tape drive per SCSI controller) for any application.

1.2. Theory of Operations

A single Desk-Top Disk Subsystem, in its most complex configuration, consists of both an intelligent 1/4" serpentine cartridge tape drive and a 5 1/4" Winchester type disk drive. The disk drive provides either 71, 141 or 327 MBytes of memory dependent on which Option you have ordered (consult your Sun price list or contact your local sales office for specific option information). The tape drive has a 45 MByte storage capacity when used with a 450 foot tape. The Tape and Disk drive controller boards communicate with the Sun workstation via the SCSI bus.

The SCSI interface board, when installed in the Sun workstation, provides an interface between the workstation's VME bus and the subsystem's SCSI bus. During a write to the subsystem, VME bus data and commands are first translated by the workstation's SCSI board; they are then placed on the SCSI bus and are presented to either of two drive controller boards. Each of the drive controller boards is used to translate the SCSI bus commands for the tape and disk drives respectively. Data and drive status are read back from the subsystem by reversing the operation. Refer to Figure 1-1 for a functional block diagram of the Sun/3 Mass Storage Subsystem.

Figure 1-1 *Functional Overview of the Sun/3 Mass Storage Subsystem*

1.3. Physical Orientation

In the remaining Chapters of this manual, all directions, such as left, right, top and bottom, are referenced to looking at the front of a Sun product when it is standing on its feet.

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SCSI Board Installation

CAUTION READ THIS BEFORE PROCEEDING.

If you are connecting a Sun-3/50 to the Sun/3 Mass Storage Subsystem, do not perform the following Section. Instead, read and perform the installation instructions in Chapter 3 — *Cabling and Placement*. The SCSI circuitry is a permanent part of the Sun-3/50 CPU Board, and therefore needs no installation.

This Chapter details the installation of the SCSI board into all Sun Workstation Logic Enclosures except the Sun-3/50.

Note that the SCSI Board must be present in the Sun Logic Enclosure to connect any of the mass storage subsystem options. If you already have an SCSI Board in your Workstation Logic Enclosure and you are not concurrently increasing the memory storage capacity of your Sun-3/75 Memory Expansion Board, you may skip to Chapter 3 — *Cabling and Placement*.

2.1. Electro-static Discharge Caution

Electro-static Discharge Caution — Some of the devices on Sun boards are very sensitive to electro-static discharge (they can be permanently damaged). An electro-static charge can build up in the human body and then discharge when you touch the board.

Before handling any board, make sure that you have placed your hand on a conductive surface that is grounded to a common earth ground, (such as the metal screws on an AC receptacle cover) to discharge the static electricity present in your body.

2.2. Springfinger Caution

Springfinger Caution — Springfingers are metal strips that are installed between the edge of the PC board and the outer panel to reduce RFI emissions. Serrated metal “fingers” protrude from either side of the strip.

If a board WITH springfingers is installed next to a board WITHOUT springfingers, the insulator shield on the outside of the fingers **MUST** be present to prevent possible shorting of component leads to the springfingers.

Installation of a board **WITHOUT** springfingers may affect RFI emissions and may therefore affect FCC compliance. Sun will no longer be responsible for FCC compliance if non-springfingered boards are added to a system originally shipped **WITH** springfingers and FCC approval.

If a logic enclosure contains boards **WITH** and **WITHOUT** springfingers, use the following guidelines:

- Before removing a board **WITHOUT** springfingers, remove the board below it (or to the left of it for pedestal mode) if that board is equipped **WITH** springfingers and an outer insulator shield.
- Always install a board **WITHOUT** springfingers first, and then replace the board **WITH** springfingers and insulator shield in the slot below it (or to the left).

If a board **WITH** springfingers is installed next to a board or filler panel also equipped **WITH** springfingers, the outside insulator shields should be removed.

Ensure that the insulator strip between the inner side of the springfingers and the PC board is intact at all times.

When removing and replacing boards with springfingers, check the condition of the insulator strip/shield(s) and replace if damaged.

Call 800 USA-4SUN with any questions, or for information on how to obtain additional insulator strips or shields.

2.3. Accessing the Workstation's Cardcage

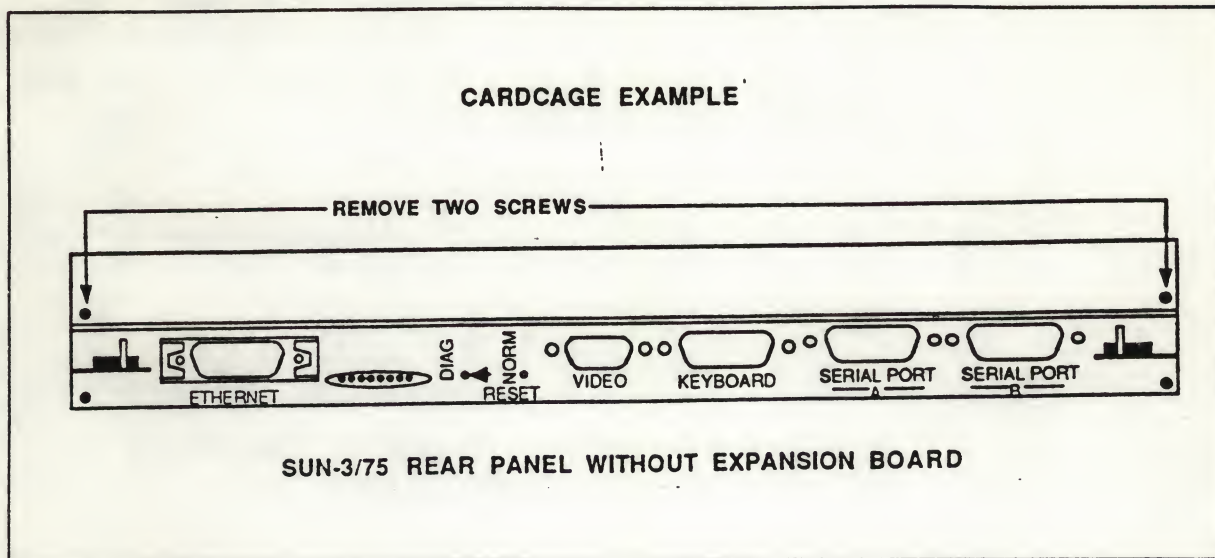
To access the Workstation's Cardcage, perform the following procedure.

1. Power-down the workstation and remove all cables from its Logic Enclosure.

NOTE The Logic Enclosure of the Sun-3/75 Workstation resides in the Monitor's base, and is accessed from the rear of the Workstation. The other Logic Enclosures (3 Slot and 6 slot) are separate from the monitor, but are also accessed from the back.

2. Refer to the *Cardcage Slot Assignments and Backplane Configuration Procedures* and determine which slot of your Workstation Logic Enclosure the SCSI Board should occupy.
3. After selecting the correct cardcage slot, unscrew the two screws securing the filler panel to the cardcage (see Figure 2-1).

Figure 2-1 Cardcage Filler Panel Securing Screws

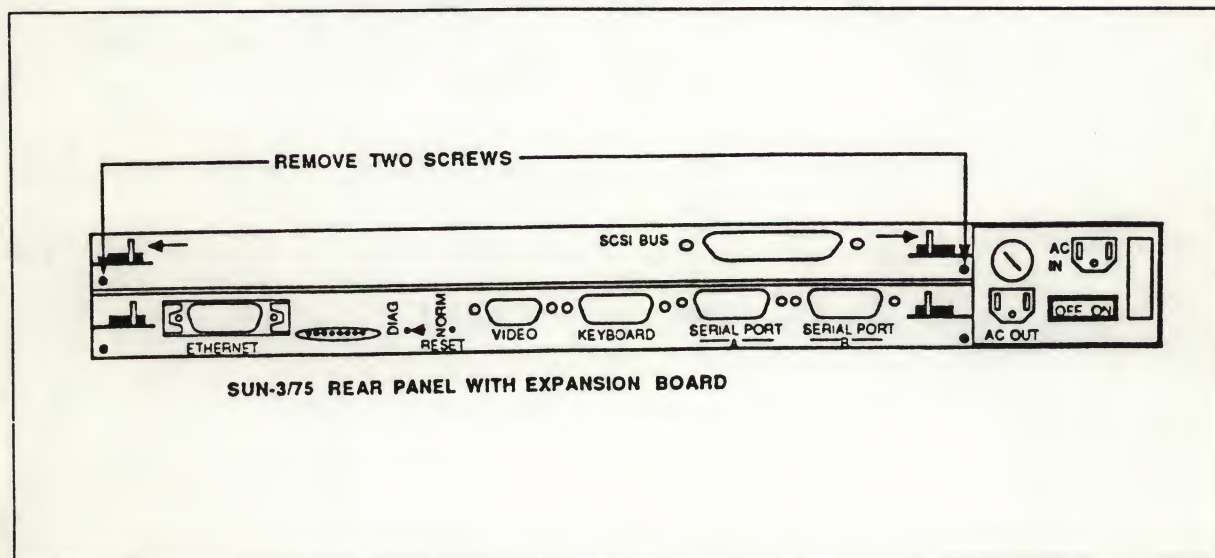


4. Withdraw the filler panel from the Workstation's Logic Enclosure.

4. *for the Sun-3/75*

If you have a Sun-3/75 Workstation that already contains a Memory Expansion board, refer to Figure 2-2 and, after you have removed the two screws, press outwards on the large black PC board extractors and withdraw the top PC board (Memory Expansion board) from the Sun-3/75 cardcage.

Figure 2-2 Removing the Memory Expansion Board from the Sun-3/75



2.4. Installing the SCSI Board

The SCSI Board is shipped as a single assembly. The assembly you received consists of either an SCSI Board on a 3 to 2 Adapter or an SCSI Board on a 0 MByte Memory Expansion Board (dependent on the Workstation application).

If you are installing the SCSI Board into a Sun-3/75 go to the next section; if this is not the case, perform the following instructions.

1. Install the SCSI Board Assembly into the slot designated in the *Cardcage Slot Assignments and Backplane Configuration Procedures*. During installation, be sure that the board is sliding in the slot's cardcage guides (both sides). The board should slide into the cardcage slot with little resistance and fit snugly when seated into the backplane connectors. While a moderate amount of force is required to seat the board, anything in excess of this is cause for inspection. Check the cardcage slot for any obvious obstructions, and both the board and the backplane for damage (bent connector pins, etc.).
2. Secure the SCSI Board Assembly to the Logic Enclosure chassis with the two screws that previously secured the filler panel.

Installing the SCSI Board into a Sun-3/75

For installation into a Sun-3/75, the SCSI board is shipped together with a 0 MByte (unpopulated) Memory Expansion board as a single assembly.

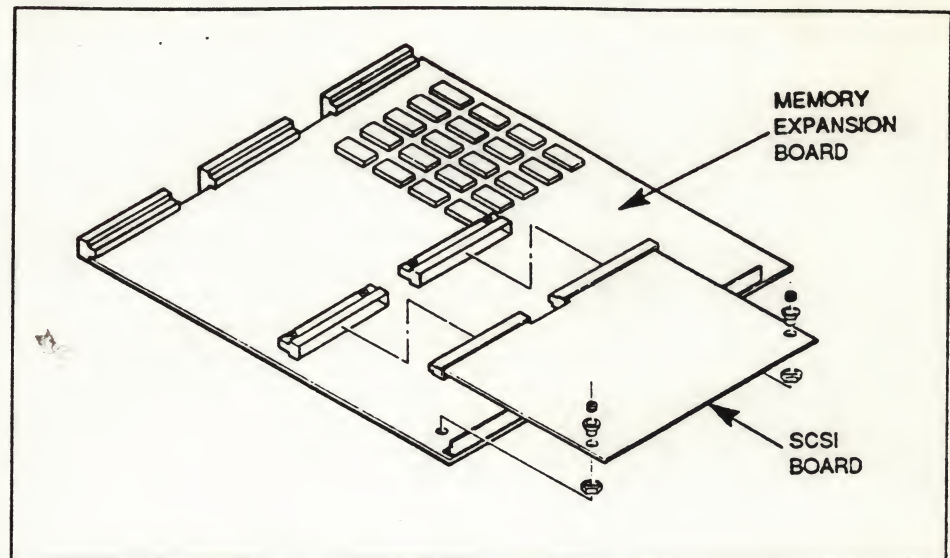
1. If no PC Board was present in the top slot of the 3/75 cardcage, install the SCSI Board Assembly (with the component side facing up) into the top slot of the 3/75 cardcage backplane. During installation, be sure that the board is sliding in the slot's cardcage guides (both sides). The board should slide into the cardcage slot with little resistance and fit snugly when seated into the backplane connectors. While a moderate amount of force is required to seat the board, anything in excess of this is cause for inspection. Check the cardcage slot for any obvious obstructions, and both the board and the backplane for damage (bent connector pins, etc.).
2. Secure the SCSI Board Assembly to the 3/75 chassis with the two screws that previously secured the filler panel.

Installing the SCSI Board onto a *Populated* Sun-3/75 Memory Expansion Board

If a populated Memory Expansion board (2 or 4 MBytes) is already installed in the Sun-3/75 card cage, perform the following steps.

1. Remove the SCSI Board from the 0 MByte Memory Expansion board it was shipped with, and mount the SCSI Board onto the "populated" Memory Expansion Board as shown in Figure 2-3.

Figure 2-3 *SCSI Board Installation onto a Memory Expansion Board*



2. Discard the 0 MByte Memory Expansion board.
3. Insert the newly assembled SCSI–Memory Expansion Board into the top slot of the 3/75 cardcage backplane (with the component side facing up). During installation, be sure that the board is sliding in the slot's cardcage guides (both sides). The board should slide into the cardcage slot with little resistance and fit snugly when seated into the backplane connectors. While a moderate amount of force is required to seat the board, anything in excess of this is cause for inspection. Check the cardcage slot for any obvious obstructions, and both the board and the backplane for damage (bent connector pins, etc.).
4. Reinstall the two screws that secured the Memory Expansion Board to the chassis.

Cabling and Placement

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Cabling and Placement

A maximum of two Mass Storage Subsystem (MSS) Options can be connected to one SCSI Board. The second of these options has a different Controller Target address on the SCSI bus, and is cabled differently. We therefore need to differentiate between these two types of options when we talk about them. We shall call the first MSS Option **Target 0** (Target 0 is the only one available with a Tape Drive), and call the second MSS Option **Target 1**.

3.1. Cabling

The Sun-3/50 is different than the other Workstations. The fundamental difference is that the SCSI circuitry is a permanent part of the Sun-3/50 CPU Board; therefore, you never need to open the Workstation. Cabling and placement information are all you need for the 3/50, and these instructions are identical for all Workstations.

3.2. Drive Defect List Location

The surface of the hard disks inside the Disk Drive is called the media, and the media is where all of your data are stored. This media is almost never absolutely perfect; therefore, each disk drive comes with a Drive Defect List. The list is provided by the drive manufacturer, and describes where on the disk these media imperfections occur.

LOCATION: The Drive Defect List is affixed to the rear of the Subsystem between the fans.

This is a very important piece of paper — don't lose it. You may need it if you ever reformat the disk drive.

3.3. Cabling for Target 0

The Sun/3 Mass Storage Subsystem is connected to a Sun Workstation as follows:

1. Ensure that the power switch on the rear of the Subsystem is in the OFF position.
2. Before continuing, read Chapter 4 for important information. Then return to this section to continue the subsystem cabling.
3. For **Target 0** Desk-Top Disk Subsystems, connect the 50-pin cable to the "SCSI BUS" connector located on the SCSI Board (or in the case of the Sun-3/50, connect the 50-pin SCSI bus cable to the "SCSI BUS" connector located on the rear of the 3/50's Monitor base).

4. Connect the opposite end of the SCSI cable to the "SCSI IN" connector located on the rear panel of the Subsystem.
5. Install the AC power cord in its receptacle in the rear panel of the Subsystem, and connect the opposite end to an AC power source.
6. The Subsystem may now be positioned either horizontally on its footpads, or vertically on its right side in the pedestal provided for this purpose (see Chapter 5 for information on how to use the pedestal).

NOTE *The Subsystem is not designed to operate while resting on its LEFT side.*

7. Refer to *Installing UNIX on the Sun Workstation* for information on how to prepare the Subsystem for loading software.

CAUTION If at a subsequent date you wish to change the orientation of your Subsystem from horizontal to vertical or vice versa, it is **HIGHLY** recommended that you reformat your disk. The basic procedure to reformat your disk follows.

- a. First, before changing the orientation of your Subsystem, back up your disk onto tape.
- b. You may now change the orientation of the Subsystem.
- c. Follow the instructions in "Installing UNIX on the Sun Workstation" to reformat the disk and rebuild UNIX.
- d. Reload the data onto the disk from your backup tape, and you're done.

3.4. Target 0 - Configuring the Sun Workstation as a Standalone System

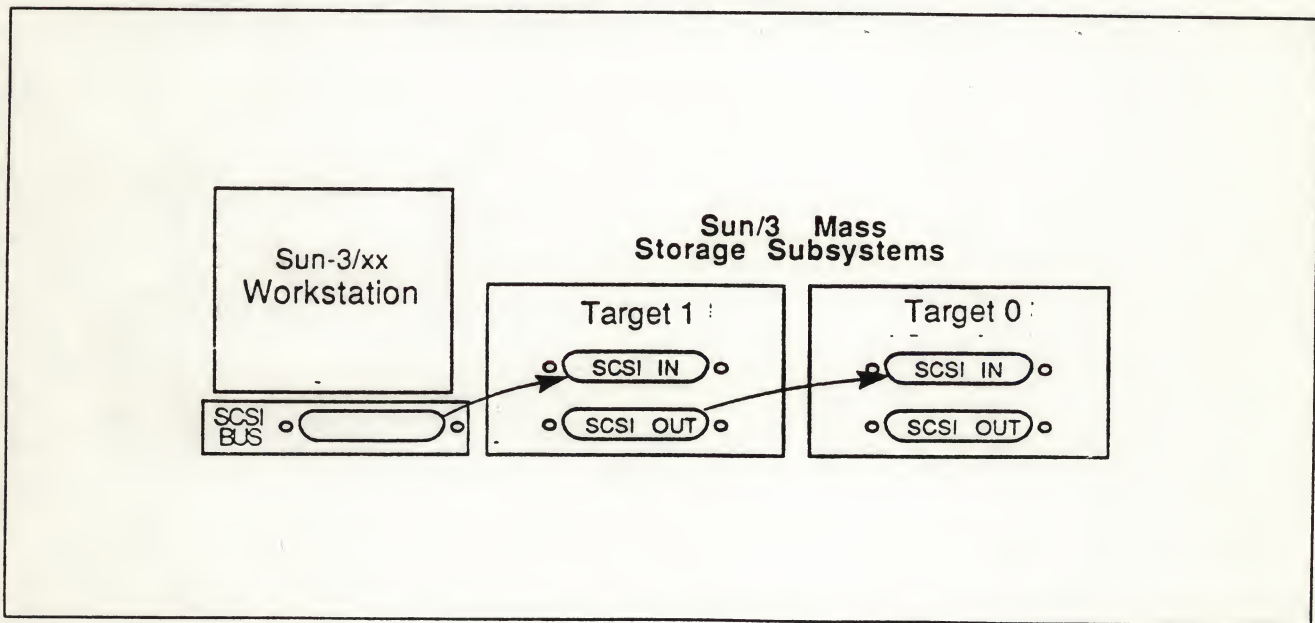
Refer to "Installing UNIX on the Sun Workstation" for the information needed to perform this software configuration.

If you experience problems after performing the procedures detailed in "Installing UNIX ..." (and you have double checked that you have performed them correctly), you may call Sun's Field Service Dispatch Center toll free at 800-USA-4SUN.

3.5. Cabling for Target 1

1. Ensure that the power switch on the rear of both the Target 1 Expansion Disk and the Target 0 Desk-Top Disk Subsystem are in the OFF position.
2. Before continuing, read Chapter 4 for important information. Then return to this section to continue the subsystem cabling.
3. For a Target 1 Desk-Top *Expansion* Disk, connect a 50-pin cable to the "SCSI BUS" connector located on the SCSI Board (or in the case of the Sun-3/50, connect a 50-pin SCSI bus cable to the "SCSI BUS" connector located on the rear of the 3/50's Monitor base).
4. Connect the opposite end of the SCSI cable to the "SCSI IN" connector located on the rear panel of the Target 1 *Expansion* Disk.
5. Connect the second SCSI bus cable between the "SCSI OUT" connector on the rear panel of the Target 1 *Expansion* Disk and the "SCSI IN" connector of the Target 0 Desk-Top Disk Subsystem (see Figure 3-1 — *Subsystem Cabling for Target 1 Expansion Disks*).

Figure 3-1 Subsystem Cabling for Target 1 Expansion Disks



5. Install the AC power cord into its receptacle in the rear panel of the Target 1 Expansion Disk and connect the opposite end to an AC power source.
6. The Target 1 Expansion Disk may now be positioned either horizontally on its footpads, or vertically on its right side in the pedestal provided for this purpose (see Chapter 5 for information on how to use the pedestal).

NOTE The Target 1 Expansion Disk is not designed to operate while resting on its LEFT side.

7. Refer to *Installing UNIX on the Sun Workstation* for information on how to prepare the Subsystem for loading software.

CAUTION If at a subsequent date you wish to change the orientation of the Target 1 Expansion Disk from horizontal to vertical or vice versa, it is **HIGHLY** recommended that you reformat your disk. The basic procedure to reformat your disk follows.

- a. First, before changing the orientation of your system, back up your disk onto tape.
- b. You may now change the orientation of the system.
- c. Follow the instructions in "Installing UNIX on the Sun Workstation" to reformat the disk.
- d. Reload the data onto the disk from your backup tape, and you're done.

3.6. Target 1 - Configuring the Sun Workstation as a Standalone System

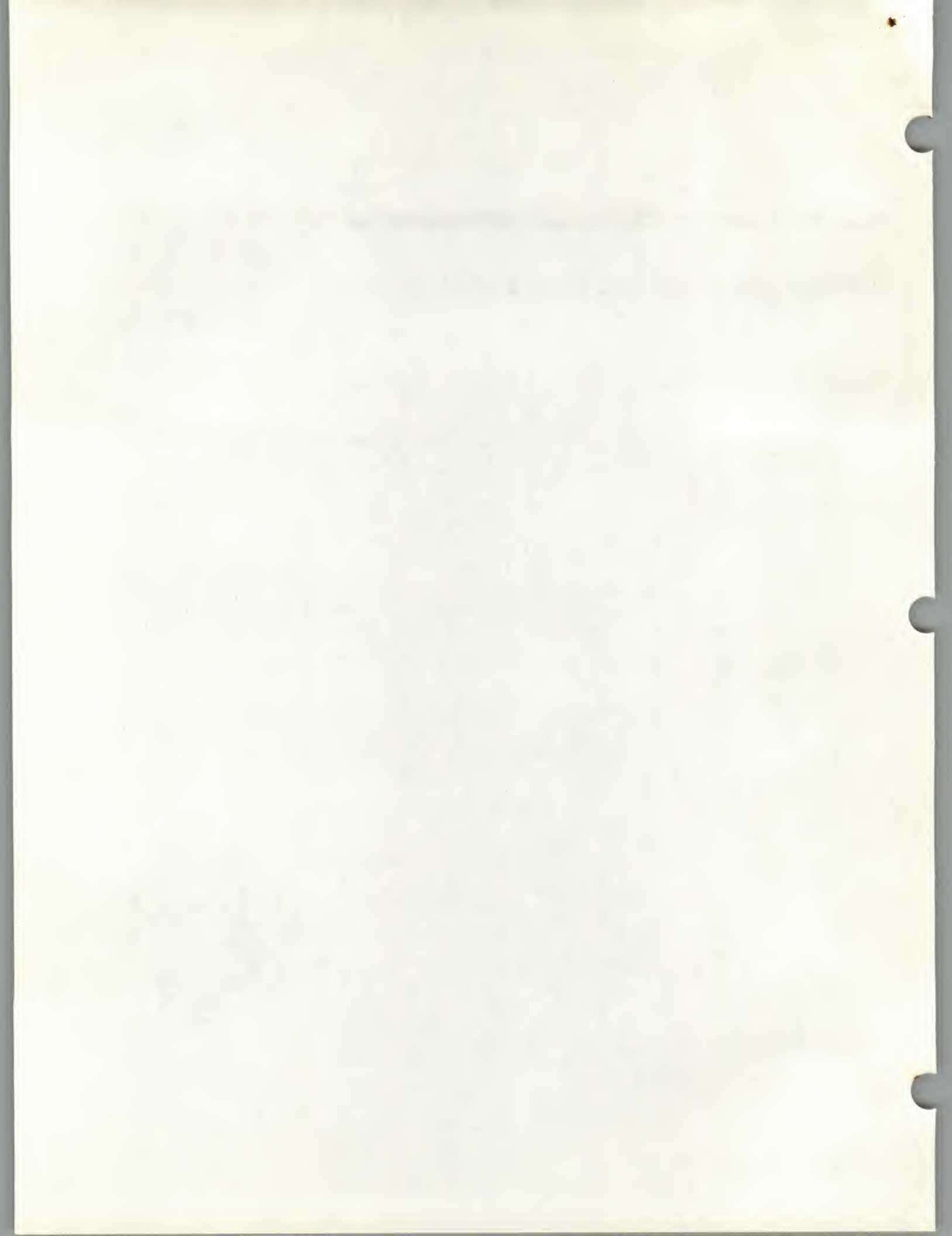
Refer to "Installing UNIX on the Sun Workstation" for the information needed to perform this software configuration.

If you experience problems after performing the procedures detailed in "Installing UNIX ..." (and you have double checked that you have performed them correctly), you may call Sun's Field Service Dispatch Center toll free at 800-USA-4SUN.

Voltage Selection and Fuse Location

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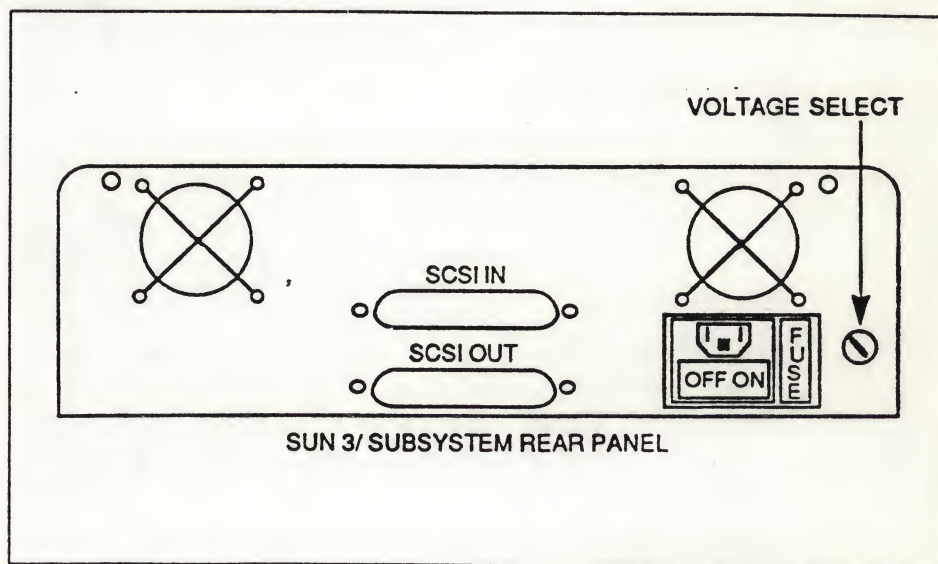


Voltage Selection and Fuse Location

4.1. Voltage Selection

There is a voltage selection switch on the rear of the Subsystem. It is very important that you check the setting and, if necessary, change it to correspond to the voltage you will be using. Refer to Figure 4-1 for the location of the voltage selection switch.

Figure 4-1 *Voltage Selection Switch Location*



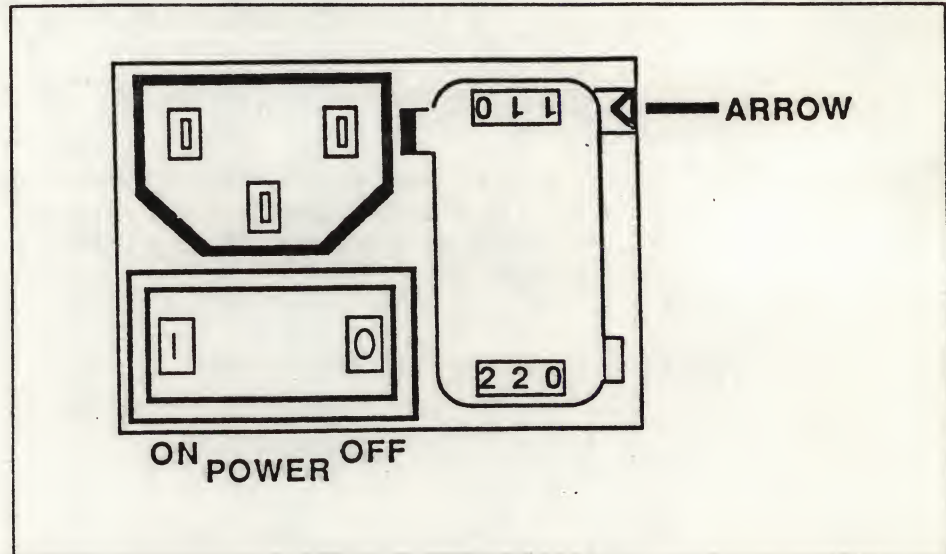
To change the voltage selection, perform the following steps.

1. Turn OFF the power switch, and then unplug the AC line cord from the back of the Subsystem.
2. Insert a screwdriver into the slot of the voltage selection switch, and rotate the screwdriver until the slot aligns with the number of the voltage you wish to select.

4.2. Fuse Location

The Subsystem was manufactured with an AC Receptacle/Fuse assembly in which the Fuse block *can* be installed two different ways (see Figure 4-2). Be aware though that there is only one correct way to install this Fuse block.

Figure 4-2 AC Receptacle/Fuse Assembly



Notice the arrow at the side of the receptacle. This arrow should always point to the number 110 on the fuse block. If the fuse block is installed with the arrow pointing to the number 220, no current will flow into the Subsystem.

CAUTION The Numbers 110 and 220 on the fuse block have no affect on or relation to voltage selection! For correct operation, the arrow on the AC Receptacle/Fuse assembly should **ALWAYS** point to the number 110. To verify or change the voltage selection, see the instructions in section 4.1.

WARNING:

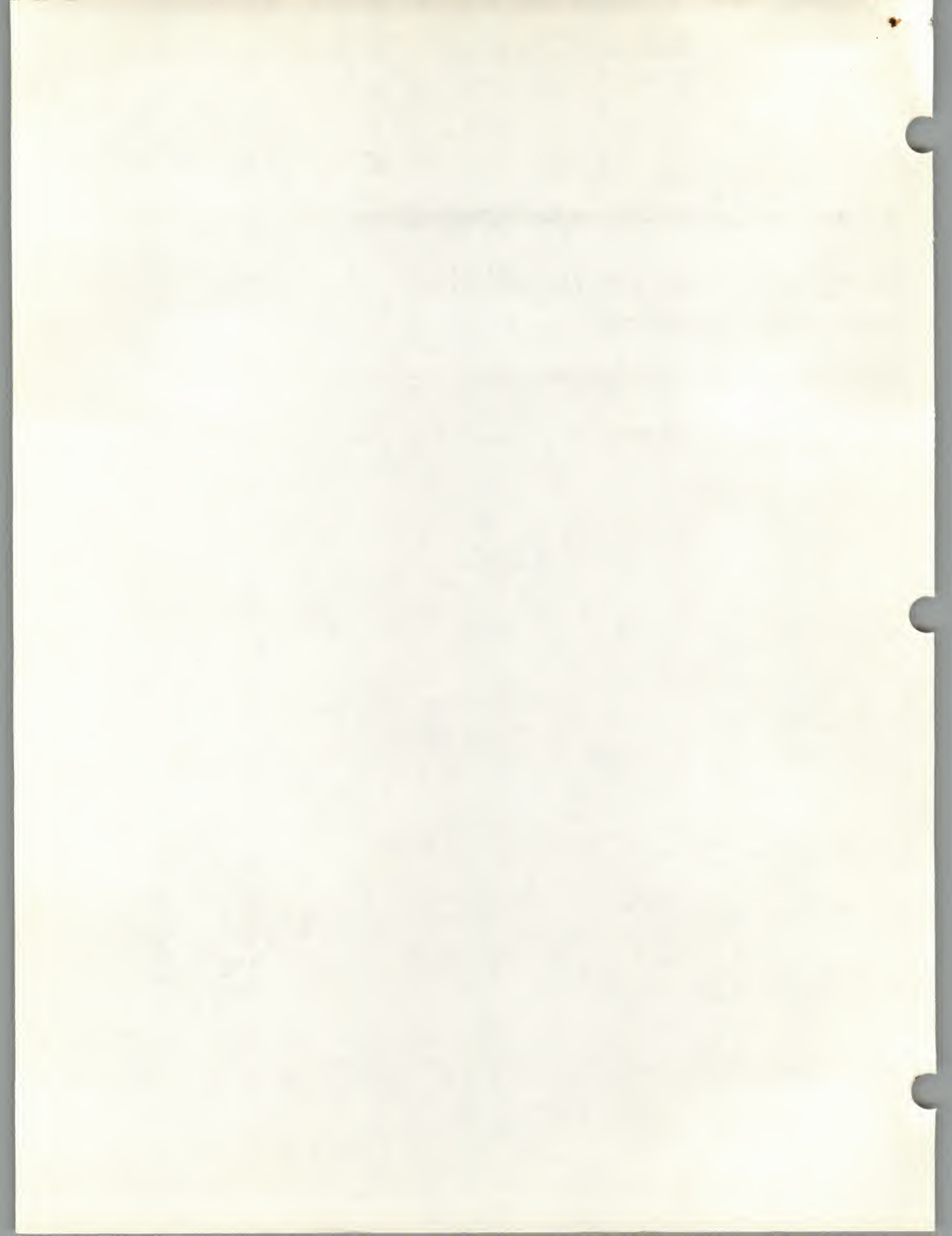
If it is necessary to alter the orientation of the fuse block (this is **EXTREMELY** unlikely) so that the arrow is pointing to the number 110, turn **OFF** the power switch and **UNPLUG THE AC LINE CORD** before removing the fuse block.

Failure to unplug the AC line cord before removing the fuse block exposes both the equipment **AND YOU** to dangerous electrical shock.

Using the Pedestal for Vertical Placement of the Subsystem

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Using the Pedestal for Vertical Placement of the Subsystem

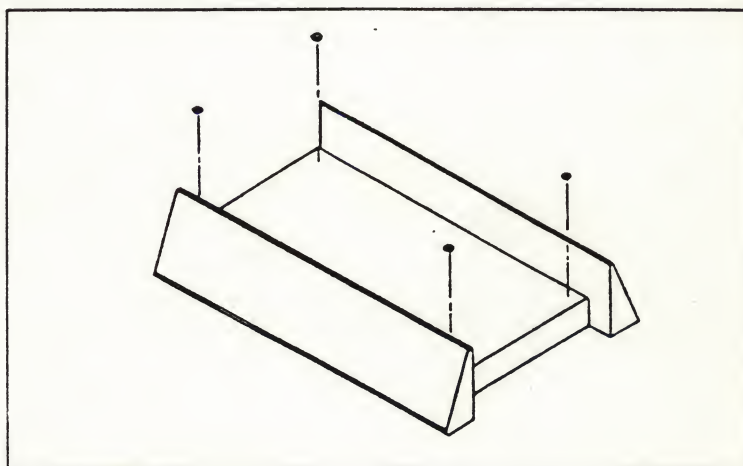
All Subsystem options come with a pedestal. This pedestal is provided so that you will be able to safely use the Subsystem while it is resting on its right-hand side. The intention of placing the Subsystem on its side is to minimize the amount of space it takes up on your desk.

If you have previously been using the Subsystem in a horizontal orientation, you should "back up" (save the files on) your disk onto tape **before** changing to a vertical mode. After you have backed up your disk onto tape, place the Subsystem into the vertical mode and follow the instructions in *Installing UNIX on the Sun Workstation* to reformat the disk. Then, reload the data onto the Subsystem disk from your backup tape.

5.1. Placing the Subsystem into the Pedestal

1. Before you place the Subsystem into the Pedestal, remove the rubber feet from their backing paper and stick them onto the Pedestal as shown in Figure 5-1. The rubber feet help to keep the disk drive insulated from shock, and they also keep the Subsystem from sliding around in the Pedestal and possibly scratching the finish on either the Subsystem or the Pedestal.

Figure 5-1 *Attaching the Feet to the Pedestal Tray*



2. Place the Subsystem into the Pedestal tray as shown in Figure 5-2.

Figure 5-2 *Installing the Subsystem into the Pedestal Tray*

